Development of Siting Decision Tool for Identifying and Characterizing Potential Electrical Generation Sites

Presentation for

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ORNL Methodology Uses GIS Approach to Screen Out Unsuitable Areas and Identify Potential Areas of Interest

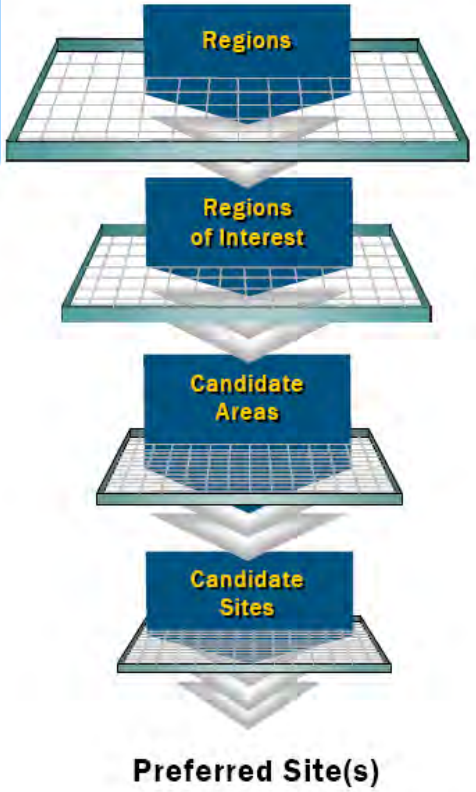
ORNL "Energy Assurance Study" identified need for 300 GWe of additional nuclear electrical generating capacity

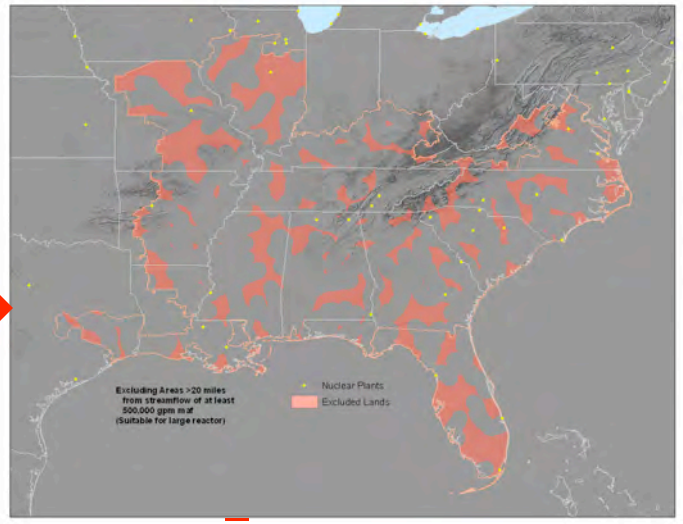
CAN WE SITE 300 GWe??

Are there viable sites?

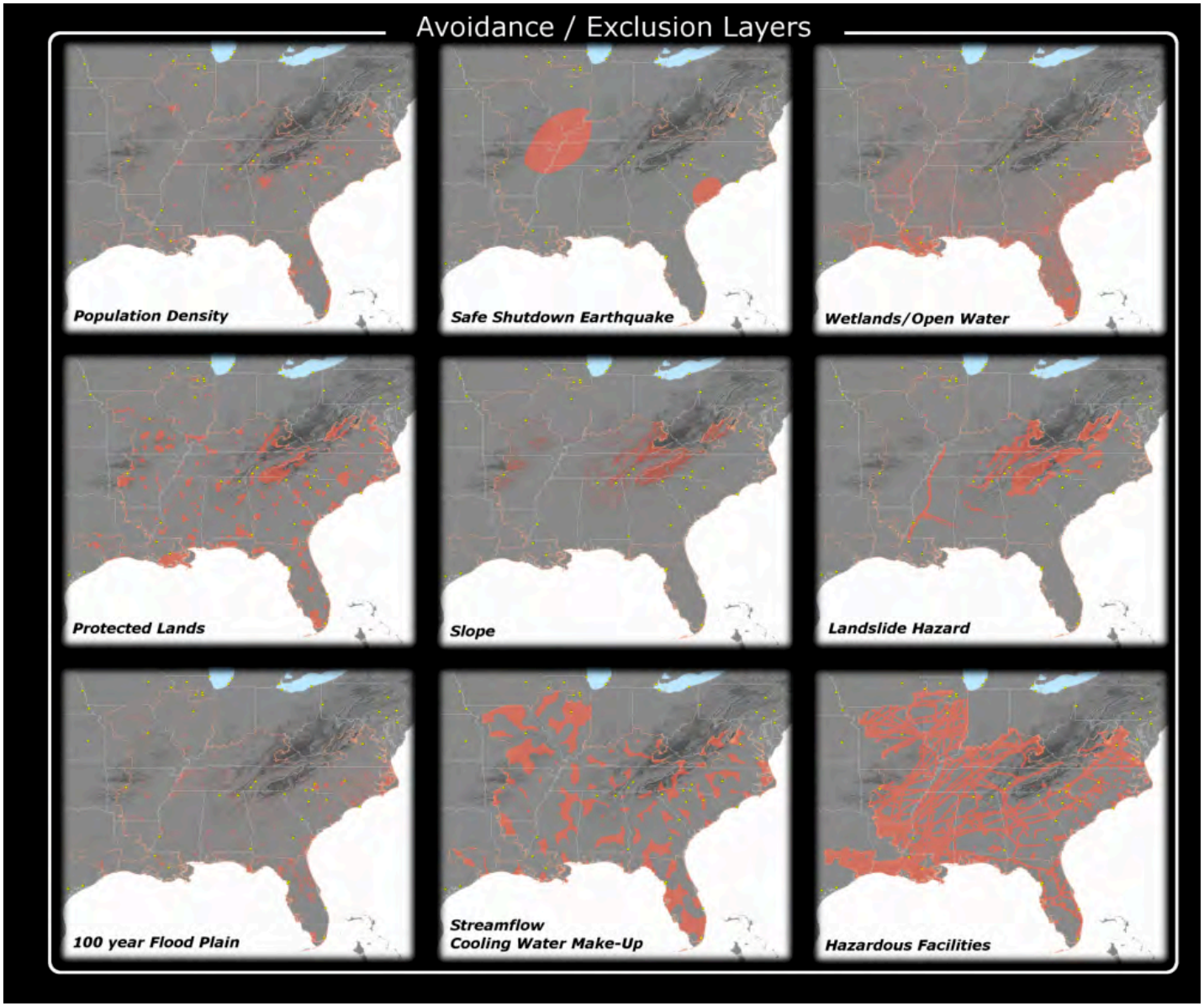
- Electrical transmission
- Population density
- Source for make-up water
- Seismic zones
- Hazardous operations
- Protected lands
- Siting of large vs. small reactors

Bechtel Approach





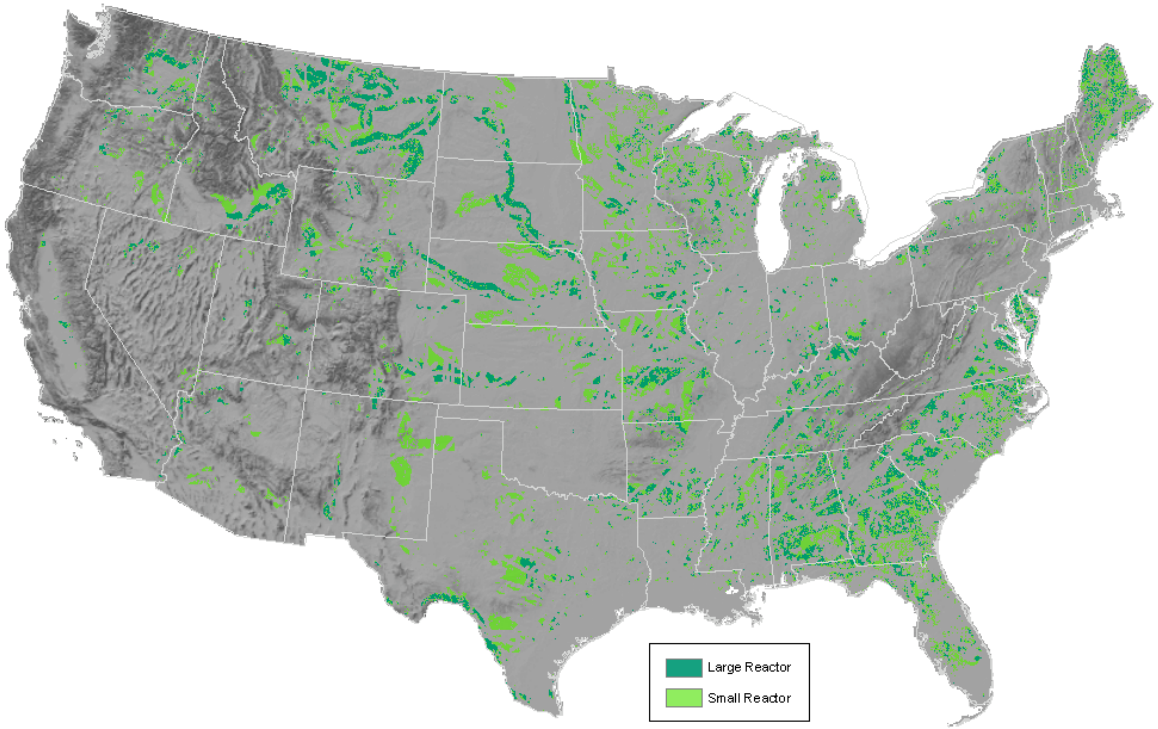
Plant Performance Envelope (PPE) Screening Factors Used in GIS Search Provide Excellent Discrimination



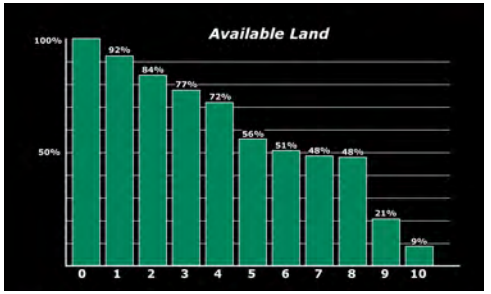
ORNL has adapted and extended PPE from EPRI 2002 Updated Siting Guide

- ** Exclusion*
- ** Avoidance*
- ** Suitability*

Applying Land and Water Requirements with PPE Provides Composite View of Candidate Areas for Siting Reactors



Cumulative Effect of Application of 9 PPE factors for U.S.



Large LWR (1600 MWe) Sites
- * 500 acres
- * 500,000 gpm
- * 4% of total land available

Small LWR (300 MWe) Sites
- * 50 acres
- * 100,000 gpm
- * 11% of total land available

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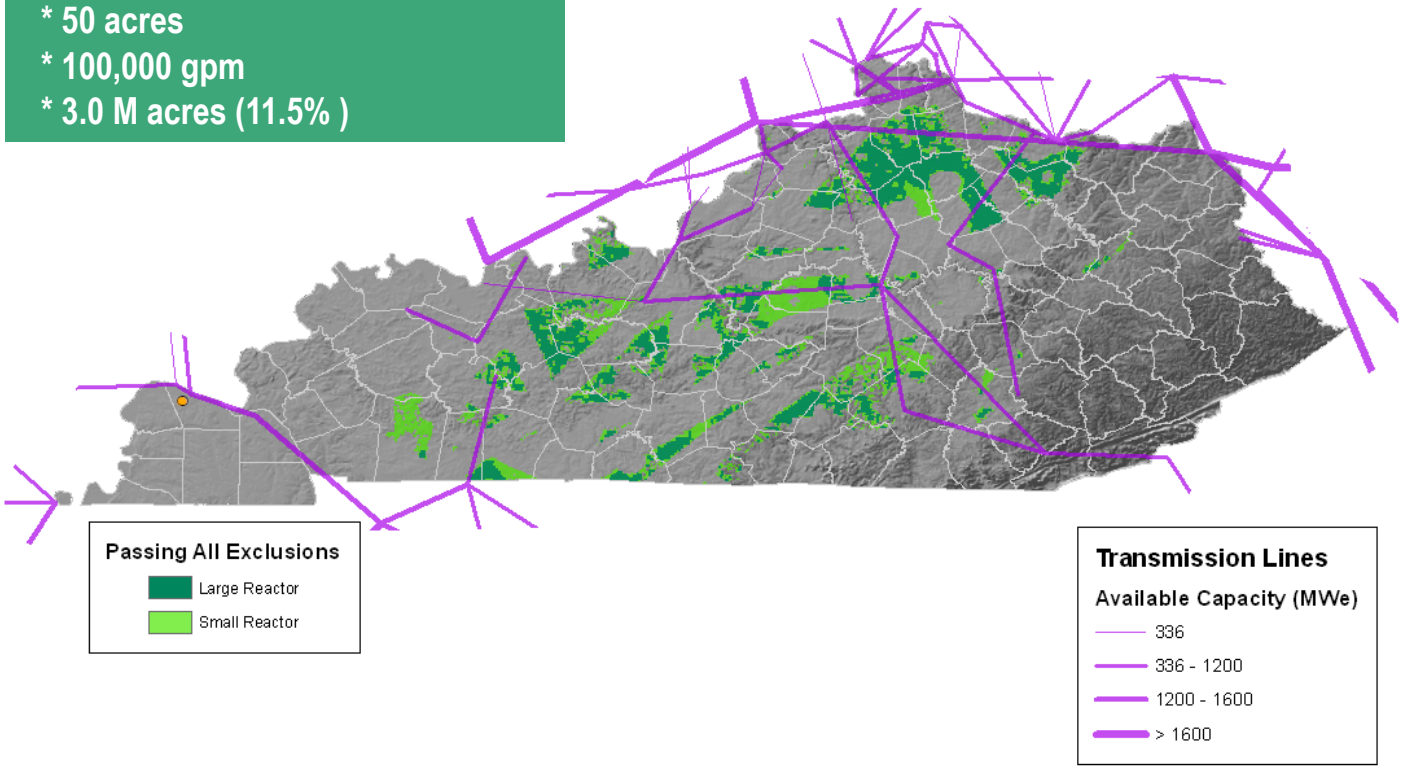
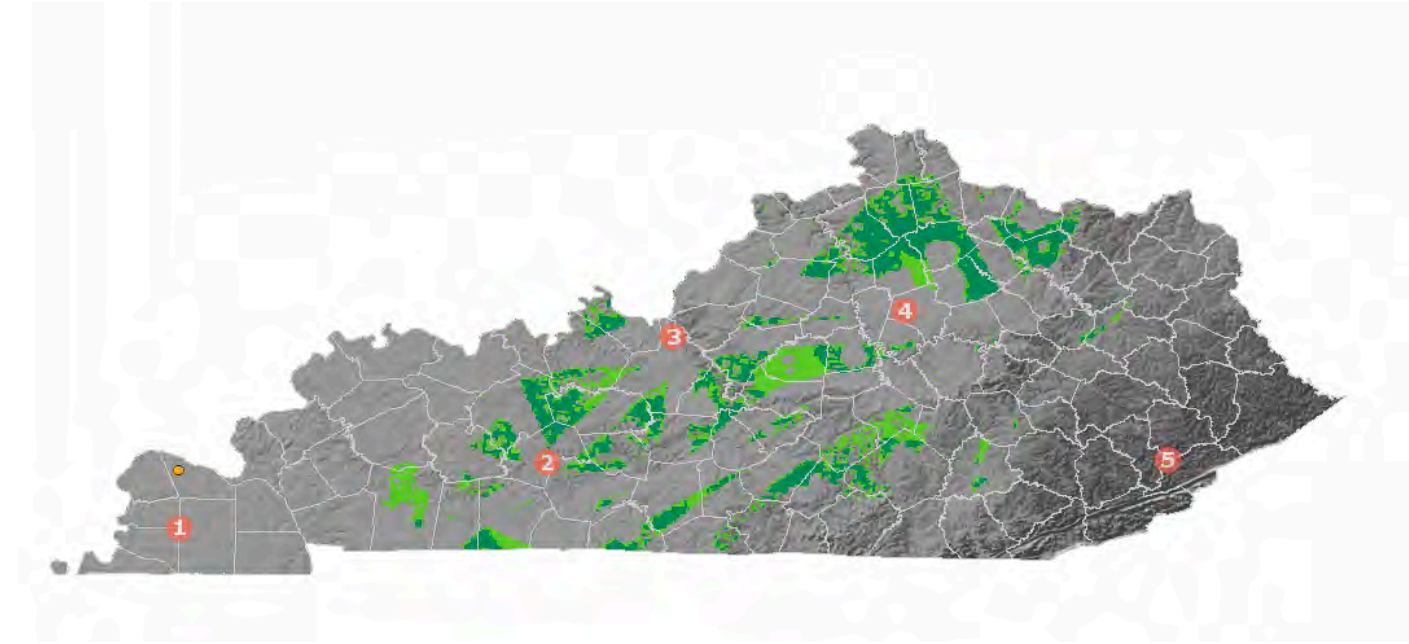
Preliminary Analysis Shows Suitable Sites for Large and Small Reactors in KY

Large LWR (1600 MWe) Sites
* 500 acres
* 500,000 gpm
* 1.5 M acres (6.5%)

Small LWR (300 MWe) Sites
* 50 acres
* 100,000 gpm
* 3.0 M acres (11.5%)



Approach Provides Insights on Issues Impacting Suitability of Sites in KY



Site No.	No. of excl	PPE Factor – Siting Issue
1	1	Earthquake – ground acceleration (exclusion)
2	1	Oil / Gas lines (avoidance)
3	1	Military base – 5 mile buffer zone (avoidance)
4	2	Airport – 10 mile buffer zone (avoidance) / population (exclusion)
5	3	Slope >12%, Landslide hazard, Sufficient water large rx (exclusion)

Summary - Coupling of PPE and GIS Methodology Provide Good Basis for Identifying and Evaluating Potential Sites

- Power plant site screening and selection process must consider many factors
- Access to modern GIS databases, computational, and visualization tools can accelerate site screening process
- Preliminary ORNL analyses suggest small NPPs double land area available for Kentucky mapping
- Many refinements possible